Research Paper | Physical Education | E-ISSN No : 2454-9916 | Volume : 9 | Issue : 9 | September 2023

EVOLUTION OF 200M INDIVIDUAL MEDLEY SWIMMING PERFORMANCE: A GLIMPSE INTO WORLD RECORD PROGRESSION

*Rajarshi Gayen[1,3], Kamal Hussain[2], Sandhya Tiwari[3]

[1] Assistant Professor, Department of Physical Education, Belda College, Belda, Paschim Medinipur, West Bengal (Corresponding Author)
[2] Department of Physics, Belda College, Belda, Paschim Medinipur, West Bengal
[3] Indira Gandhi Institute of Physical Education and Sport Sciences, University of Delhi

ABSTRACT

Swimming being a very important event for any games, especially the Olympics an analysis has been made of the progression of the world record timing in 200m (IM) for both the men and women category. It is clear that the record time has reduced over the year. We have predicted some of the key factors like technology, training, environmental factors and pool design which may have contributed to this progression of world record time.

KEYWORDS: Individual Medley, Swimming Performance, World Record.

1. INTRODUCTION

The Olympic Games being a pinnacle of sporting excellence have served to showcase the evolution of human athletic prowess. Among the various disciplines, swimming is considered as one of the most captivating and technically demanding sports. From the beginning of the modern Olympics to the present, the progression of swimming performance is a testament to the dedication, innovation, and relentless pursuit of excellence by athletes, coaches, and the swimming community as a whole (Lätt et al., 2010).

Swimming has been a part of the Olympics since its revival in 1896, with the inaugural competition taking place in open water. Over the years, various swimming styles emerged, leading to the establishment of distinct strokes – freestyle, breaststroke, backstroke, and butterfly. As techniques improved and athletes gained a better understanding of hydrodynamics, early records set the foundation for what was to come. As we look into the history of individual medley (IM) event we find that before butterfly was established as an individual stroke in 1952, individual medley races comprised of just three strokes and were typically swam over three or six lengths. It was in a 150 yard IM race – known at the time as three stroke medley. One of the first examples of butterfly arm technique was used by Henry Myers who used an over arm recovery for the full length of his opening breaststroke leg in the year 1933. A butterfly leg was added to IM races in the 1950s with races taking the form of butterfly, backstroke, breaststroke and then freestyle. Unlike in individual freestyle race, we cannot swim butterfly, backstroke or breaststroke in the freestyle leg of an IM race.

The 20th Century witnessed remarkable advancements in swimming techniques and training methods. The introduction of the flip-turn, a technique that allows swimmers to maintain their speed and momentum at the end of a lap, revolutionized competitive swimming. Australian swimmer Dawn Fraser's domination in freestyle events during the 1950s and 1960s showcased the potential of specialization and focused training. In 1956, the butterfly stroke emerged as a distinct style, altering the landscape of competitive swimming. Swimmers like Michael Phelps, with his unparalleled 23 Olympic gold medals, and Katie Ledecky, redefining long-distance freestyle, epitomize the incredible feats of the 21st century swimmers. Phelps, in particular, demonstrated how innovative training techniques, advanced equipment, and a deep understanding of biomechanics can lead to unprecedented levels of success (Crowley, et al. 2017).

In this manuscript we analyze the evolution of 200 m IM Swimming Performance in the history of world record for both men and women category, respectively. IM event consists of four different strokes namely freestyle, backstroke, breaststroke and butterfly. There are two different distances swam in IM event which are 200m and 400m respectively. In the year 1964 at Tokyo Olympic 400m IM was first introduced and 200m IM was first held in 1968 and next in the year 1972. After that since Los Angeles 1984, 200m IM has been held in every edition.

Although Olympic IM events are only contested over 200m and 400m distances, IM race also exists for short course events where competitors has to swim one length of 25 m of each stroke.

2. MATERIALS AND METHODS

The work is based on the data of 200 m (IM) men and women are swimming performance. We considered the world records only which were obtained from dedicated websites [https:\\www.yourswimlog.com, https://myswimsplits.com]

3. RESULTS

Using the data from the above mentioned websites for men and women's 200 m (IM) swimming records we plot the bar diagram of the world record progression with time for both men and women category in Fig.1 and Fig. 2, respectively.

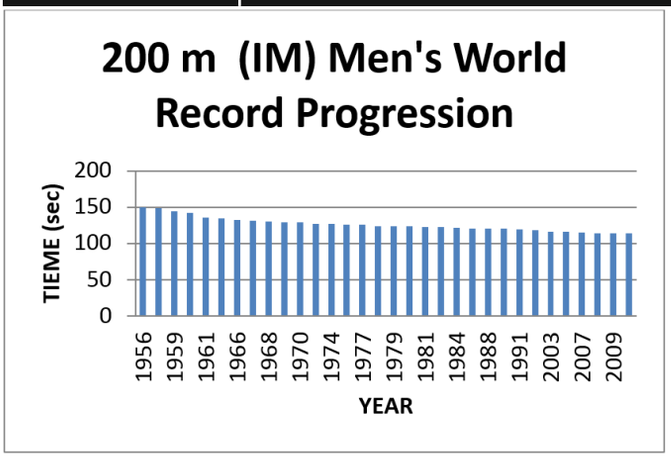

Fig.1. 200m IM Men's World Records Progression

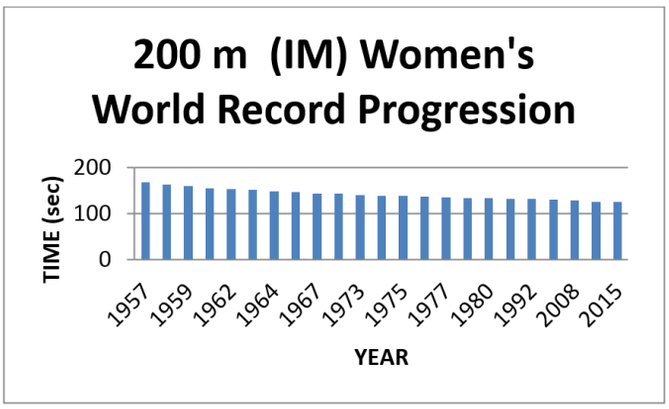

Fig.2. 200m IM Women's World Records Progression

The diagrams clearly show how with the advancement of technology and innovative training techniques the record time has slowly reduced over time.

4. DISCUSSION

Various factors have contributed to the slow reduction in the record time over the years. Here we discuss some of the important factors whose contribution in this regard cannot be overlooked.

4.1 Technology and Training: A Winning Combination

The evolution of swimming performance has been heavily influenced by advancements in technology. High-speed cameras, underwater filming, and computer simulations have provided athletes and coaches with valuable insights into stroke mechanics and hydrodynamics. This understanding has led to refinements in body positioning, stroke efficiency, and energy conservation (Jürimäe et. al., 2007). Innovations in swimsuit technology have also played a significant role in performance progression (Plaut, 2001).The introduction of full-body, hydrodynamic swimsuits in the 2008 Beijing Olympics caused a surge in world records. However, controversy over their impact on fairness and performance prompted regulatory changes by FINA (Fédération Internationale de Natation), the international governing body for swimming, leading to more stringent guidelines for swimsuit design (Lavoie, J. M., et.al. 1986)

4.2 The Role of Training and Specialization

Modern swimmers benefit from highly specialized training regimens tailored to their specific events. This approach allows athletes to fine-tune their techniques, optimize energy expenditure, and enhance muscle strength for the demands of their chosen strokes. (Crowley et. al., 2017). The integration of strength and conditioning programs, as well as sports psychology, has further contributed to improved swimming performance. (Cordian and Kopriva, 1991, Mooney et. al., 2016, Costill et. al., 1988, Bächlin and Tröster, 2012, Lätt et. al., 2009).

4.3 Environmental Factors and Pool Design

Pool design and environmental conditions also play a role in swimming performance. The construction of faster, deeper, and better-regulated pools has led to reduced turbulence, thereby allowing swimmers to maintain their streamlined positions and minimize drag. Furthermore, factors like water temperature and altitude can impact swimmers' performance, necessitating meticulous preparation and adaptation strategies. (Stewart et. Al., 2000) There may be an optimal time for swimming performance: Olympic swimmers clock faster times at 5 p.m., according to research from Stanford University circadian biologist Renske Lok, PhD, and an international team of scientists. (Lok et al., 2020) analyzed Olympic swim times of 72 female and 72 male swimmers between 2004 and 2016. Data analysis showed that time of day strongly affected performance, with fastest times occurring around 5:12 p.m.—a 0.32% improvement relative to 8 a.m. Although this amounts to fractions of seconds, for swimmers it can mean the difference between a gold medal and a bronze. (Geladas et. al., 2005)

5. CONCLUSIONS

The progression of swimming performance in the Olympics reflects the synergy between human determination, technological innovation, and scientific understanding. (Sheard et. al., 2006) From the early strokes to the cutting-edge techniques of today, swimmers continue to push the boundaries of what was once thought possible. As the world watches in awe during each Olympic Games, it is a testament to the relentless pursuit of excellence that defines the essence of competitive swimming. One important observation is that before 1970 the stopwatches were unable to record time to high precision. The smallest time measurable was 1/10th of a second. After 1970 the stopwatches were technically advanced to measure a time as small as 1/100th of a second .

6. REFERENCES

1. Lätt, E., Jürimäe, J., Mäestu, J., Purge, P., Rämson, R., Haljaste, K., & Jürimäe, T. (2010). Physiological, biomechanical and anthropometrical predictors of sprint swimming performance in adolescent swimmers. Journal of Sports Science & Medicine, 9(3), p.398.
2. Crowley, E., Harrison, A. J., & Lyons, M. (2017). The impact of resistance training on swimming performance: A systematic review. Sports Medicine, 47, p.2285-2307.
3. https://www.yourswimlog.com
4. https://myswimsplits.com
5. Jürimäe, J., Haljaste, K., Cicchella, A., Lätt, E., Purge, P., Leppik, A., & Jürimäe, T. (2007). Analysis of swimming performance from physical, physiological, and biomechanical parameters in young swimmers. Pediatric Exercise Science, 19(1), p.70-81.
6. Plaut, I. (2001). Critical swimming speed: its ecological relevance. Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology, 131(1), p.41-50.
7. Lavoie, J. M., & Montpetit, R. R. (1986). Applied physiology of swimming. Sports medicine, 3, 165-189.
8. Cordain, L., & Kopriva, R. (1991). Wetsuits, body density and swimming performance. British Journal of Sports Medicine, 25(1), p.31-33.
9. Mooney, R., Corley, G., Godfrey, A., Osborough, C., Newell, J., Quinlan, L. R., & ÓLaighin, G. (2016). Analysis of swimming performance: perceptions and practices of US-based swimming coaches. Journal of Sports Sciences, 34(11), p.997-1005.
10. Costill, D. L., Flynn, M. G., Kirwan, J. P., Houmard, J. A., Mitchell, J. B., Thomas, R., & Park, S. H. (1988). Effects of repeated days of intensified training on muscle glycogen and

swimming performance. Medicine and Science in Sports and Exercise, 20(3), p.249-254.
11. Bächlin, M., & Tröster, G. (2012). Swimming performance and technique evaluation with wearable acceleration sensors. Pervasive and mobile computing, 8(1),p. 68-81.
12. Lätt, E., Jürimäe, J., Haljaste, K., Cicchella, A., Purge, P., & Jürimäe, T. (2009). Physical development and swimming performance during biological maturation in young female swimmers. Collegium Antropologicum, 33(1), p.117-122.
13. Stewart, A. M., & Hopkins, W. G. (2000). Consistency of swimming performance within and between competitions. Medicine and Science in Sports and Exercise, 32(5), p.997-1001.
14. Lok, R., Zerbini, G. , Gordijn, M. C. M., Beersma, D. G. M. & Hut, R. A. (2020). Gold, silver or bronze: circadian variation strongly affects performance in Olympic athletes. Scientific Reports, 10, 16088.
15. Geladas, N. D., Nassis, G. P., & Pavlicevic, S. (2005). Somatic and physical traits affecting sprint swimming performance in young swimmers. International Journal of Sports Medicine, 26(02), p.139-144.
16. Sheard, M., & Golby, J. (2006). Effect of a psychological skills training program on swimming performance and positive psychological development. International Journal of Sport and Exercise Psychology, 4(2), p.149-169.